

CLAIMS

What is claimed is:

1. A deployable structure comprising;

a support;

at least one structural element, the at least one structural element mechanically attached to the support, wherein the structural element comprises:

a continuous wire, wherein the continuous wire is adapted to form a plurality of foldable sections; and wherein the continuous wire is adapted to form at least one torsion spring between the plurality of foldable sections; and

at least one latching mechanism assembly, the at least one latching mechanism assembly adapted for containing the at least one structural element in a non-deployed state.

2. A deployable structure as in claim 1 wherein the structural element comprises a radio antenna adapted to transmit, receive, or transceive radio frequency signals.
3. A deployable structure as in claim 1 wherein the radio antenna comprises a horizontally polarized antenna.
4. A deployable structure as in claim 1 wherein the radio antenna comprises a vertically polarized antenna.

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5. A deployable structure as in claim 1 wherein the at least one foldable section comprises a transducer array.

6. A deployable structure as in claim 5 wherein the transducer array comprises at least one solar energy transducer.

7. A deployable structure as in claim 5 wherein the transducer array comprises at least one acoustic transducer.

8. A deployable structure as in claim 1 wherein the at least one latching mechanism assembly comprises:

a shape memory device, the shape memory device electrically connectable to a first voltage potential;

a strap pin, the strap pin electrically conductive and mechanically attached to the shape memory device; and

a strapping wire, the strapping wire electrically and mechanically connectable to the strap pin and to a second voltage potential.

9. A deployable structure as in claim 8 wherein the shape memory device comprises a thermally actuated shape memory device.

10. A deployable structure as in claim 9 wherein the thermally actuated shape memory device comprises a contracting shape memory device.

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11. A method for constructing and storing a deployable structure, the method comprising the steps of:

determining a deployed rectangular structure size;

forming a perimeter shape of the determined deployed rectangular structure with a continuous structural element;

folding the perimeter shape into at least one uniform section; and storing the uniform sections in a supporting device.

12. A method as in claim 11 wherein the step of determining a deployed rectangular structure size further comprises the step of optimizing the deployed rectangular structure to transceive RF signals.

13. A method as in claim 11 wherein the step of folding the perimeter shape into at least one uniform sections comprises the step of forming one end of the at least one uniform section into a torsion spring.

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14. A method as in claim 11 wherein the step of storing the uniform sections in the support device comprises the steps of:

- providing an electrically conductive strap pin;
- attaching a thermally actuated memory device to the electrically conductive strap pin;
- folding the at least one uniform section into a space adapted to receive the at least one uniform section;
- connecting a strapping wire to a first voltage potential;
- wrapping the strapping wire around the at least one uniform section so as to oppose the torsional force inherent in the torsional spring and retain the rectangular shape in its at least one folded uniform section; and
- mechanically latching the electrically conductive strap pin to the strapping wire.

15. A self erecting turnstile antenna system, the system comprising:

- a supporting device;
- a plurality of antenna elements connected to the supporting device; and
- at least one latching mechanism assembly, the at least one latching mechanism assembly connected to the supporting device.

16. A self-erecting turnstile antenna as in claim 15 wherein the plurality of antenna elements each comprise:

a continuous wire, having:

a first uniform rectangular section, wherein the first uniform rectangular section is mechanically attached to the support device by two 90-degree torsion springs; and

a second uniform rectangular section, wherein the second uniform rectangular section is mechanically coupled to the first uniform rectangular section by two 180-degree torsion springs.

17. A self-erecting turnstile antenna as in claim 16 wherein the two 90 degree torsion springs are comprised of the continuous wire.

18. A self-erecting turnstile antenna as in claim 16 wherein the two 180 degree torsion springs are comprised of the continuous wire.

19. A self-erecting turnstile antenna as in claim 15 wherein the at least one latching mechanism assembly comprises:

a strapping wire;

a strap pin, the strap pin connectable to the strapping wire; and

a thermally actuated memory device, the thermally actuated memory device electrically connected to the strap pin.